dynamics and its possible role in the late Pleistocene ice sheet oscillations is new and a substantial contribution. I found the chapters on this subject the most interesting.

In view of the difficulties of writing a book on this subject, the authors' presentation of their important and substantial research on the vital role of the cryosphere in the earth's climate is reasonably successful. I suspect that it is more likely to be of use to a climate modeler in understanding ice sheets than to a glaciologist in understanding the earth's climate, so in a sense it is a one-way bridge. For the student of modeling it could indeed provide a useful source for an advanced graduate or seminar course.

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Astrophysical Plasmas

Magnetic Reconnection in Space and Laboratory Plasmas. EDWARD W. HONES, JR., Ed. American Geophysical Union, Washington, D.C., 1984. xii, 386 pp., illus. $33. Geophysical Monograph Series, 30. From a conference, Los Alamos, N.M., Oct. 1983.

It has been over 30 years since magnetic reconnection was first proposed as the acceleration mechanism responsible for plasma energization in both the solar flare and the terrestrial aurora. Initially reconnection was greeted by some members of the scientific community with a great deal of skepticism. However, in the intervening years it has come to occupy a preeminent position in our understanding of the dynamical behavior of astrophysical plasmas. It has also been discovered to be one of the major sources of plasma instability in magnetic containment devices such as the tokamak.

This volume is an impressive collection of more than 50 papers presented at a Chapman Conference. The book provides both a good review of the basics of magnetic reconnection and a broad survey of some of the more exciting and recent observations and developments.

Basically, reconnection involves the flow of plasma in topologically complex magnetic field configurations that usually involve magnetic null regions. It is the breakdown of ideal magnetohydrodynamics at these null regions (or their topological equivalents) that allows the vast amounts of magnetic energy typically stored in an astrophysical plasma to be efficiently converted into kinetic and thermal energy.

Unfortunately, the mathematical theory of the reconnection process is extremely difficult to formulate, and analytical solutions are available only in highly idealized cases. It is this inherent mathematical intractability that has been, and continues to be to some extent, the source of much controversy.

In many ways the history of magnetic reconnection parallels that of plate tectonics. Both concepts were treated with much suspicion when they were first proposed, primarily because simple theoretical arguments were quickly expounded to show why the concepts were not viable. In the case of magnetic reconnection it was thought that astrophysical plasmas lacked the electrical resistivity necessary to provide the diffusion of the magnetic field that produces reconnection. However, the accumulation of observational evidence eventually forced a reevaluation of the theoretical objections to both concepts.

As with plate tectonics, part of the appeal of magnetic reconnection is its ability to account for a very wide range of phenomena with a single, unifying principle. The book shows just how diverse these phenomena can be, for it contains in-depth discussions of magnetic reconnection in solar flares, coronal heating, comet tails, the terrestrial dayside magnetosphere, the geomagnetic tail, the Jovian magnetosphere, laboratory fusion machines, and various assorted galactic and extra-galactic objects. In addition there are sections on basic theory, recent computational results, and future directions and unanswered questions.

Transcripts of the question-and-answer periods following each presentation have been edited and have had references added where appropriate to make them comprehensible to those who did not attend the meeting. The inclusion of the transcripts is valuable, for they give the reader an idea of the major controversies existing at the present time.

Although one usually thinks of conference proceedings as being of interest only to specialists, I think this volume deserves to be considered by a wider audience. The papers (which have been refereed) are well written and articulate, and they are intended to be understandable to nonspecialists.

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